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EXAMINER	
ZHENG, EVA Y	
ART UNIT	**PAPER NUMBER**
2611	

DATE MAILED: 04/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/844,283	BUCHWALD ET AL.	
	Examiner	Art Unit	
	Eva Yi Zheng	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 January 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11 and 13-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,11,13-19 and 21* is/are rejected.

7)☒ Claim(s) *5-10,20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 1/30/06 have been fully considered but they are not persuasive. Examiner has thoroughly reviewed Applicant's arguments but firmly believes that the cited reference reasonably and properly meet the claimed limitation as rejected.

A) Applicant's argument – Independent claim 15, (a) Dabell disclose x'(t) 230 is not a clock signal. (b) Dabell does not perform sampling as recited in the claim.

Examiner's response – (a) In Dabell, a clock signal generated by an oscillator is inputted to receiving node 120 in Fig. 2. This clock signal from oscillator constitute as a clock signal for each multi-gigabit analog information signal in the claim. (b) In Dabell, element 220 in Fig. 2 represents a channel impulse response. It is well known that a channel impulse response is sampled at a specific rate, usually a Nyquist rate, to avoid aliasing. Therefore, Dabell does not fail to teach claimed limitations.

B) Applicant's argument – Claim rejections under 35 U.S.C§103, Dabell and Mazor failed to teach claim recitations and did not provide any motivation or suggestion.

Examiner's response – Applicant is reminded that the Examiner is entitled to give the broadest reasonable interpretation to the language of claims. (a) Regarding to claim 1, sampling analog signal in analog domain is claimed in step 1, but applicant didn't claim or emphasize that equalizing in step 2 and quantizing in step 3 are both in analog domain, instead, merely performing equalizing and quantizing based on the result of step 1. Dabell disclose an equalization and quantizing system in digital domain. Mazor

teaches an analog sampler 14 as shown in Fig. 1. This is obvious to one of ordinary skill in art to apply an analog sampler prior to the A/D of Dabell's equalization system. By doing so, sampling the analog signal, improve data recovery and minimize bit errors.

(b) Regarding to claim 14, Dabell disclose an equalizer (330 in Fig. 3; more details in Fig. 4), wherein the equalizer received multiple input signals sampled via multiplexor, calculating coefficient using LMS. Therefore, Dabell meet claim limitations.

C) Applicant's argument - Regarding claim 21, Shimomura failed to teach adaptive equalizer.

Examiner's response - Shimomura et al. disclose a system comprising monitoring of wavelength-multiplexed light by a wavelength-multiplexed light gain equalizer (as shown in Fig. 23). Monitor 14 monitors the quality of signals, including the gain equalizing quality. Therefore, it is inherent that equalizer exist in Shimomura et al.'s system.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claim 15 is rejected under 35 U.S.C. 102(e) as being anticipated by Dabell (US 6,621,862)

a) Regarding claim 15, Dabell discloses a method for adaptively equalizing a plurality of multi-gigabit analog information signals for respective signal paths, comprising the steps of:

(1) generating a clock signal for each of the multi-gigabit analog information signals from each of the respective multi-gigabit analog information signals (signal generated by oscillator in Fig. 2);

(2) sampling each of the multi-gigabit analog information signals according to the respective clock signals (220 in Fig. 2, Col 3, L 24-27);

(3) performing an equalizing process on the samples (330 in Fig. 3); and

(4) quantizing the equalized samples (351-354 in Fig. 3).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-4,11, 13, 14 and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dabell (US 6,621,862) in view of Mazor (US 5,235,671).

a) Regarding claim 1, Dabell discloses a method for adaptively equalizing a multi-gigabit analog information signal for a signal path, comprising the steps of:

(2) performing an equalizing process on the analog samples (330 in Fig. 3); and

(3) quantizing the equalized samples of the multi-gigabit analog information signal (351-354 in Fig. 3).

Dabell disclose all the subject matters described above except for the specific teaching of sampling the multi-gigabit analog information signal and generating analog samples. However, Mazor, in the same field of endeavor, teaches an equalizer system comprises a sampler coupled with analog input signal (14 in Fig.1). Both Dabell and Mazor focus on improving signal quality and reducing distortion. Therefore, it is obvious to one of ordinary skill in art to combine the sampler circuit by Mazor in the Dabell's equalizer system. By doing so, sampling the analog signal, improve data recovery and minimize bit errors.

b) Regarding claim 2, Dabell discloses the method according to claim 1, wherein step (2) comprises the steps of:

(a) comparing a multi-level representation of the equalized samples with the quantized equalized samples (640 in Fig. 6, Col 4, L 67 – Col 5, L9);

(b) performing a least-means-squared operation on results of the comparison (440 in Fig. 4, Col 4, L 8-11);

(c) adjusting an equalization coefficient with a result of the least-means-squared operation (Col 4, L 14-27); and

(d) repeating steps (2)(a) through (2)(c) (as shown in Fig. 4).

c) Regarding claim 3, Dabell discloses all the subject matters described above except for the specific teaching of equalizing process has a sub-sampling rate relative to the sampling rate of analog information signal.

However, it is well known and common knowledge that the equalizer sampling rate is not same as the input signal sampling rate due to tap coefficient in equalization control (as shown in Fig. 4). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to conclude that the sampling rate of equalizer by Dabell is a sub-sampling rate relative to the input signal.

d) Regarding claim 11, Dabell discloses the method according to claim 1, wherein step (2) comprises the step of minimizing inter-symbol interferences in the samples (as shown in Fig. 4; Col 4, L 4-18).

e) Regarding claim 14, Dabell discloses a method for adaptively equalizing a time staggered portions of a plurality of multi-gigabit analog information signals for respective signal paths, comprising the steps of:

(1) generating clock signals from the plurality multi-gigabit analog information signals (x'(t); 230 in Fig. 2);

(2) sampling each of the multi-gigabit analog information signals at a plurality of phases of the respective clock signals (220 in Fig. 2, Col 3, L 24-27);

(3) measuring an equalization quality of the samples from one of the plurality of phases for each of the multi-gigabit analog information signals (as shown in Fig. 4);

(4) equalizing the samples from each of the phases of each of the multi-gigabit analog information signals based on the measured equalization quality of the one phase of each of the respective multi-gigabit analog information signals (330 in Fig. 3); and

(5) quantizing the equalized samples (351-354 in Fig. 3).

Dabell discloses all the subject matters above except for the specific teaching of a plurality of phases. However, Dabell's invention is to improve convention equalization, where a plurality of time-variant multichannel gigabit signals are received. Therefore, it is obvious to one of ordinary skill in art to understand the input signals of Dabell has a plurality of phases with plurality of time.

f) Regarding claim 16, Dabell discloses a system for quantizing a multi-gigabit analog information signal, comprising:

(2) an equalizer coupled to said sampler (150 as shown in Fig. 3); and

(3) a quantizer coupled to said equalizer (351-354 in Fig. 3);

wherein said equalizer minimize inter-symbol interferences in samples output from said sampler and said quantizer quantizes equalized samples output from said equalizer (Col 3, L 55-Col 4, L30).

Dabell disclose all the subject matters described above except for the specific teaching of a sampler to sample a multi-gigabit analog signl to generate analog samples. However, Mazor, in the same field of endeavor, teaches an equalizer system comprises a sampler coupled with analog input signal (14 in Fig.1). Both Dabell and Mazor focus on improving signal quality and reducing distortion. Therefore, it is obvious to one of ordinary skill in art to combine the sampler circuit by Mazor in the Dabell's

equalizer system. By doing so, sampling the analog signal, improve data recovery and minimize bit errors.

g) Regarding claim 17, Dabell discloses the system according to claim 16, wherein said equalizer comprises an finite impulse response filter ("FIR") (341-344 in Fig. 3) having at least one adjustable tap (as shown in Fig. 5), said system further comprising control logic coupled to said FIR (330 in Fig. 3), wherein said control logic generates tap updates for said FIR (440 in Fig. 4).

h) Regarding claim 18, Dabell discloses the system according to claim 17, wherein said control logic comprises:

a first input (141-144 in Fig. 3) coupled to an output of said equalizer (as shown in Fig. 3);

an analog-to-digital converter ("ADC") (321-324 in Fig. 3) coupled to said first input (141-144 in Fig. 3); and

a control module (330 in Fig. 3) coupled to an output of said ADC;

wherein said ADC generates multi-level representations of equalized samples (Col 3, L39-45), and said control module generates said tap updates from at least said multi-level representations of the equalized samples (440 in Fig. 4).

i) Regarding claim 19. Dabell discloses the system according to claim 17, wherein said control logic comprises:

a second input (301-301 in Fig. 3) coupled to an output of said quantizer (as shown in Fig. 3); and

a least-means-squared ("LMS") module coupled to said first and second control logic inputs (Fig. 4);

wherein said LMS module compares the multi-level representations of equalized samples with the quantized samples from said quantizer and generates said tap updates according to the comparison (Col 4, L 8-25).

6. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dabell (US 6,62,862 B1).

Regarding claim 13, Dabell discloses a method for adaptively equalizing time staggered portions of a multi-gigabit analog information signal for a signal path, comprising the steps of:

(1) sampling a multi-gigabit analog information signal (141-144 in Fig. 1, Col 3, L 6-9; 220 in Fig. 2, Col 3, L 24-27);

(2) measuring an equalizing quality of the samples from one of the plurality of phases (Fig. 4; input signals 141-144);

(3) equalizing the samples from each of the phases based on the measured equalization quality of the one phases (330 in Fig. 3); and

(4) quantizing the equalized samples (351-354 in Fig. 3).

Dabell discloses all the subject matters above except for the specific teaching of time staggered signal and a plurality of phases. However, Dabell's invention is to improve convention equalization, where a plurality of time-variant multichannel gigabit signals are received (as shown in Fig. 3). Therefore, it is obvious to one of ordinary skill

in art to understand the input signals of Dabell has a plurality of phases with plurality of time.

7. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dabell (US 6,62,862 B1) in view of Mazor (US 5,235,671), further in view of applicant admitted prior art.

Regarding claim 4, Dabell and Mazor disclose all the subject matters described above except for the specific teaching of equalizer process at an off-set of a sub-sampling rate relative to the sampling rate of analog information signal.

However, it is well known and common knowledge that ADC can operated on every equalized sample from the FIR filter, or any subset and or off-set thereof (Pg 6, [0144]). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to conclude that the equalizer system by Dabell performs at an off-set of a sub-sampling rate relative to the input signal.

8. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimomura et al. (US 6,404,525 B1).

Regarding claim 21, Shimomura et al. disclose a system for routing and adaptively equalizing high data rate analog data signals, comprising:

a backplane (18 in Fig. 1) having a plurality of signal paths (λ1-n in Fig.1); and

at least one interface coupler (12 in Fig. 1) coupled to said backplane, said interface board including a plurality of receivers (13-n in Fig. 1) coupled to said

backplane signal paths, each said receiver including an adaptive equalizer (inherent as 14 in Fig. 1);

wherein each said equalizer adapts to an associated backplane signal path to equalize an signal received from said associated backplane signal path (as shown in Fig. 1).

Shimomura et al. disclose all the subject matter described above except for the specific teaching of an interface board coupled to the backplane. Instead, Shimomura et al. disclose optical coupler coupled to the backplane.

However, it is a common knowledge that an electrical signal router comprises interface board. In optical signal system coupler replaces an interface board. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention was made to realize that different signal system comprise different interface technology, although their functionalities are essentially the same. It would have been designer's choice merely base on signal source.

Allowable Subject Matter

9. Claims 5-10 and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

10. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eva Y Zheng whose telephone number is 571-272-3049. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Eva Yi Zheng
Examiner
Art Unit 2611

April 10, 2006

CHIEH M. FAN
SUPERVISORY PATENT EXAMINER